

Claims

1. A data carrier into which, by a laser beam, identifiers are introduced in the form of patterns, letters, numbers and/or images that are visible due to local changes in the optical properties of the data carrier, effected by the laser beam and resulting from material transformations, **characterized in that** the data carrier comprises a laser-sensitive recording layer that is transparent in the visible spectral range and that is provided with a surface relief in the form of a lens grid, such that the identifiers are introduced with the laser beam from different directions through the lens grid into the recording layer and are perceptible when viewed from those same directions, and in that the data carrier is transparent at least in the area of the introduced identifiers.
2. The data carrier according to claim 1, **characterized in that** the changes in the optical properties of the data carrier are visible in transmitted light.
3. The data carrier according to claim 1 or 2, **characterized in that** the changes in the optical properties of the data carrier are visible in reflected light.
4. The data carrier according to at least one of claims 1 to 3, **characterized in that** the lens grid comprises cylindrical lenses and/or spherical lenses.
5. The data carrier according to at least one of claims 1 to 4, **characterized in that** the recording layer is formed by a non-self-supporting layer of a thickness of about 1 μm to about 800 μm .
6. The data carrier according to at least one of claims 1 to 5, **characterized in that** the recording layer is disposed in the interior of the data carrier.

7. The data carrier according to at least one of claims 1 to 6, **characterized in that** the identifiers comprise personal data, such as a signature, a birth date, a portrait or the like.
- 5 8. The data carrier according to at least one of claims 1 to 7, **characterized in that** the identifiers comprise data relating to the data carrier, such as a validity period, a card number, information about the issuing authority or institute or the like.
- 10 9. The data carrier according to at least one of claims 1 to 8, **characterized in that** the identifiers are present in screened form, the grid elements preferably being formed by rod-shaped pixels.
- 15 10. The data carrier according to at least one of claims 1 to 9, **characterized in that** the identifiers that are perceptible from different directions are present nested within each other in the recording layer.
- 20 11. The data carrier according to at least one of claims 1 to 10, **characterized in that** the data carrier exhibits an at least partially transparent main body, in or on which the recording layer and the lens grid are disposed.
12. The data carrier according to at least one of claims 1 to 11, **characterized in that** the data carrier exhibits, in addition to the identifiers, black-and-white or colored impressions and/or further laser inscriptions.
- 25 13. The data carrier according to at least one of claims 1 to 12, **characterized in that** the data carrier is provided with one or more further security features, especially with luminescent, magnetic or electrical substances, or with optically variable structures, such as holographic structures.

14. The data carrier according to at least one of claims 1 to 13, **characterized in that** the data carrier constitutes a value document, such as a banknote, an identification card or the like.

5 15. The data carrier according to at least one of claims 1 to 13, **characterized in that** the data carrier constitutes a security element for application to a value document, such as a banknote, an identification card or the like.

10 16. A value document, such as a banknote, identification card or the like, having a value document substrate having a window area or hole that is covered on one side or on both sides with a security element according to claim 15.

17. A method for manufacturing a data carrier according to at least one of claims 1 to 15, in which

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- the laser-sensitive recording layer that is transparent in the visible spectral range is provided with the surface relief in the form of a lens grid, and
 - subsequently, in a transparent area of the data carrier, the identifiers are
- 20 introduced with the laser beam from different directions through the lens grid into the recording layer, such that the identifiers are perceptible when the data carrier is later viewed from those same directions.

25 18. The method according to claim 17, **characterized in that** the identifiers are introduced in a screening method, the grid elements preferably being formed by rod-shaped pixels.

19. The method according to claim 18, **characterized in that** the grid elements are produced by irradiating the lens grid with laser pulses.